

Information sheet

Petroleum and Gas

Fracking and BTEX

This information sheet provides general information in relation to fracking, fracking chemicals, the regulation of benzene, toluene, ethylbenzene, and xylenes (BTEX) chemicals and the monitoring of fracking activities in Queensland.

What is fracking?

Fracking is the process of creating cracks in underground rock formations to increase the flow and recovery of gas or oil out of a well. Fracking is also known as fracture stimulation, hydraulic fracturing, fraking, fracking, hydrofracking or fracturing.

Due to the varying geology of gas or oil reservoirs, it is not always necessary to undertake fracking as part of gas or oil operations. Fracking is not undertaken for all gas or oil operations (including coal seam gas), however for deep gas and oil activities (such as production of shale gas and oil, tight gas and basin-centred gas) fracking is undertaken in almost every well.

How is it done?

Fracking is initiated from the well (in Queensland, generally hundreds of metres below the ground within a coal seam or thousands of metres below the ground for a shale formation) and involves pumping fracking fluid under pressure into the target formation. The pressure from the fluid entering the space causes cracks in the rocks that allow gas to flow up the well and be captured.

Fracking can take place horizontally and vertically. The extent of a fracture depends on the frac design and underground geology. These days there are a number of technologies used by the onshore oil and gas industry to ensure fractures only travel as far as needed to obtain the gas or oil. If a fracture travels too far the resource is then harder to extract.

After the target formation has been fraced some or most of the fracking fluid is returned to the surface by underground pressure. This fracking fluid is stored in appropriately designed, constructed and lined dams or storage containers. It is then either treated or disposed of at an appropriate facility.

Typically, the fracking process only takes a few days but testing of the well may be carried out for many months afterwards to ensure the frac was successful and no environmental harm was caused.

Why is fracking undertaken?

Fracking is used to increase oil or gas production from low permeability rocks, such as those from which deep gas and oil are obtained. The use of fracking can reduce the total number of wells required to be drilled, thereby increasing the distance between wells, and reducing the level of land disturbance and visual impact of wells on the landscape.

Fracking fluid

Fracking fluid is made up of three components:

- proppant (sand or another man-made equivalent) (approx. 9%). This keeps the cracks open, allowing gas to reach the well and rise to the surface.
- water (approx. 90%) to carry the sand/proppant under pressure into the well.
- chemical additives (approx. 1%) that make the mixture more gel-like and hold the sand as it is pumped into the target formation.

What chemicals are used?

The chemicals used in the fracking process typically include common household compounds such as:

- sodium hypochlorite (used in swimming pools);
- hydrochloric acid (used in swimming pools);
- surfactants (used in soaps);
- cellulose (the cell wall of green plants); and
- acetic acid (the basis of vinegar).

The exact nature of the fracking mixtures used by companies in Queensland will vary due to the different geological environments.

Why are chemicals used in the process?

Chemical additives are used in fracking to:

- assist other chemical additives to biodegrade once the frac is complete;
- stabilise clays to ensure the formation stays intact;
- keep pH (acid balance) neutral;
- eliminate bacteria; and
- ensure the fluid moves easily into the fractures.

Regulating BTEX

Queensland laws restrict the use of BTEX chemicals in fracking. These laws help ensure that the BTEX chemicals, benzene, toluene, ethylbenzene and xylene don't exceed the Australian environmental and human health standards. Because the standard is so stringent and the levels of allowed BTEX chemicals are so low, this means that in practice BTEX chemicals cannot be added to fracking fluids.

BTEX chemicals can occur naturally in water sources and are also found in commonly used machinery products like oil or petrol. In some instances, trace levels of these chemicals may be detected at a fraced site, even where they have not been used.

BTEX standards apply to all new and existing petroleum, geothermal and greenhouse gas storage operations as a condition of their environmental authority (EA).

More detailed information on BTEX is available on the Queensland Government website (www.qld.gov.au) using the search term 'BTEX chemicals'.

Is fracking safe?

Like any commercial or resource activity there are risks but when these risks are managed appropriately then fracking is a safe activity for the environment and surrounding communities. The fracking process occurs underground and is designed to only impact on the targeted resource formation.

How does the government monitor fracking activities?

Prior to undertaking fracking activities, the Queensland government requires that operators must:

- carry out an environmental risk assessment for every well proposed to be stimulated as a condition of their EA;
- provide details of their proposed fracking operations to the Department of Natural Resources, Mines and Energy (DNRME), including the location of wells;
- provide details of the chemical additives to be used and the toxicity of ingredients and mixtures to DNRME; and
- develop a stimulation impact monitoring program that must be complied with during fracking, as regulated by the Department of Environment and Science (the department).

The risk assessment and monitoring program ensure that all the relevant matters for each well are considered prior to fracking activities taking place, and that any identified risks will be mitigated or managed to prevent environmental harm occurring.

In addition, the department imposes strict environmental conditions on EA's. This may include requirements for companies to take action, such as:

- drain and rehabilitate any ponds that were designed to evaporate fracking fluid over the long term;
- undertake comprehensive water quality monitoring of both groundwater in the well to be fracked and in landholder bores;
- have comprehensive contingency and emergency response planning for water-quality related incidents; and
- monitor groundwater and landholders bores prior to and following fracking activities.

These conditions are legally enforceable and heavy penalties apply for non-compliance. Petroleum and gas companies are legally required to notify of any environmental incident or breach of a condition. In addition to this, the government closely monitors fracking activities through compliance programs including:

- attendance at fracking activities;
- auditing fracking operations;
- desktop audits of the information submitted by petroleum and gas companies; and
- independent monitoring of water bores in proximity to petroleum and gas operations.

A copy of these conditions (Conditions—Well construction, maintenance and stimulation activities) that are imposed on EA's can be found in the guideline: Streamlined model conditions for petroleum activities (ESR/2016/1989)¹.

How do I know when fracking is happening on my land?

Landholders must be notified in writing at least 10 days before a company undertakes any fracking activities and 10 days after the activities have been completed. The first notice contains information about planned activities and the second notice details what actually occurred, including provision of information about actual chemicals and volumes used.

For more information please contact DNRME on 13 QGOV (13 74 68).

¹ This guideline is available at www.qld.gov.au, using the search term "streamlined model conditions".

What action will the government take if environmental impacts are identified?

If fracking is thought to have affected water quality in an aquifer, the department may require an environmental evaluation on the incident, and undertake an investigation. Then, depending on the outcome of the evaluation, further action can be taken under Queensland's strict environmental laws. This may include ordering the petroleum and gas company to cease the fracking activity and to clean up and remediate any environmental harm caused.

In the event that serious environmental harm is caused as a result of fracking activities, the maximum penalty for an individual under the *Environmental Protection Act 1994* is a maximum fine of 6,250 penalty units or five years imprisonment. A corporation may incur a maximum fine of 31,250 penalty units.

Version History

Version	Effective date	Description of changes
1.00		First published version of the guideline.
2.00	10 July 2014	Major amendments to version 1.00, including content and administrative changes.
3.00	29 November 2016	Major amendments to version 2.00, including content and administrative changes.
3.01	5 July 2017	General administrative updates.
3.02	17 May 2018	The document template, header and footer have been updated to reflect current Queensland Government corporate identity requirements and comply with the Policy Register.